

The prevention of yellow fever.

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THE PREVENTION OF YELLOW FEVER

The Colonial Office

His Majesty's Stationery Office,
1906.



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THE PREVENTION OF YELLOW FEVER.

Yellow fever can be absolutely suppressed by the application of simple, practicable, and non-costly methods.

In order to carry them out the following facts must be known:—

1. It has been proved that Yellow Fever can only be transmitted by the bite of a particular mosquito known as the "Tiger" or "Brindled Mosquito" (*Stegomyia fasciata*), which must have previously bitten a person suffering from Yellow Fever; in no other way can it become infected. Yellow Fever is not caused by opening up the ground, dredging, canal making, nor by contact with yellow fever patients, their clothes or bedding.



Common Breeding Places of the *Stegomyia*.

2. This mosquito is found in abundance in Mexico, the southernmost portions of the United States, Central and South America, the West Indies, as well as in many other places in tropical and sub-tropical countries.



"Wiggle Waggles" or Larvæ of *Stegomyia*. Magnified about 6 times. (After Dr. Goeldi.)

It is common in the seaports but extends into inland towns following the trade routes.

3. It is essentially a town dweller and is the common "Domestic" or "House Mosquito." It is not known to be a marsh or swamp dweller.

4. It breeds in the clean water receptacles in the yards of houses, and in consequence it is often known as the "Cistern Mosquito." The actively moving "wrigglers" or "wiggle waggles" which are found in great abundance in cisterns, barrels and kerosine tins, used for the storage of water, constitute the larval stage of the mosquito.

5. It also breeds in old bottles, meat, and condensed milk tins, flower pots, conch shells, and discarded receptacles of all kinds capable of holding water for a few days, and which are commonly found in all badly kept yards and rubbish heaps.

It also breeds in rain water which may collect in canoes, in the lily tubs, and it may even make its appearance in the water vessels in the rooms if the water is allowed to remain undisturbed in them for a few days.

6. It is not usually found in gutters, pools or wells, but if debarred access to the common water receptacles it may be driven to seek unusual breeding places.

7. It must be remembered that if this mosquito is found in a house its breeding place is usually close at hand.

8. Because of the fact that the *Stegomyia* is a cistern breeder, yellow fever may occur in the wealthier and more sanitary parts of the town as well as in the poorer insanitary districts.

9. It is readily distinguished from other mosquitoes by its very characteristic appearance. It is a "Black and White Mosquito." There is a lyre-shaped pattern in white on the back of the thorax, transverse white bands on the abdomen, white spots on the sides of the thorax, and the legs have white bands with the last hind tarsal joint also white.

10. The mosquito deposits its eggs on the water in the cistern. The eggs develop in from 10 to 20 hours into the active wriggling larvæ. The larval or wiggle stage lasts $6\frac{1}{2}$ to 8 days, and is then followed by the pupa stage: from the pupa in two days' time or even less a complete mosquito emerges and flies into the nearest house.

The eggs are resistant and capable of preserving their vitality although removed from water for some 10 to 90 days. They may therefore persist for a long period in an empty damp barrel and develop into wigglers when the barrel is filled.

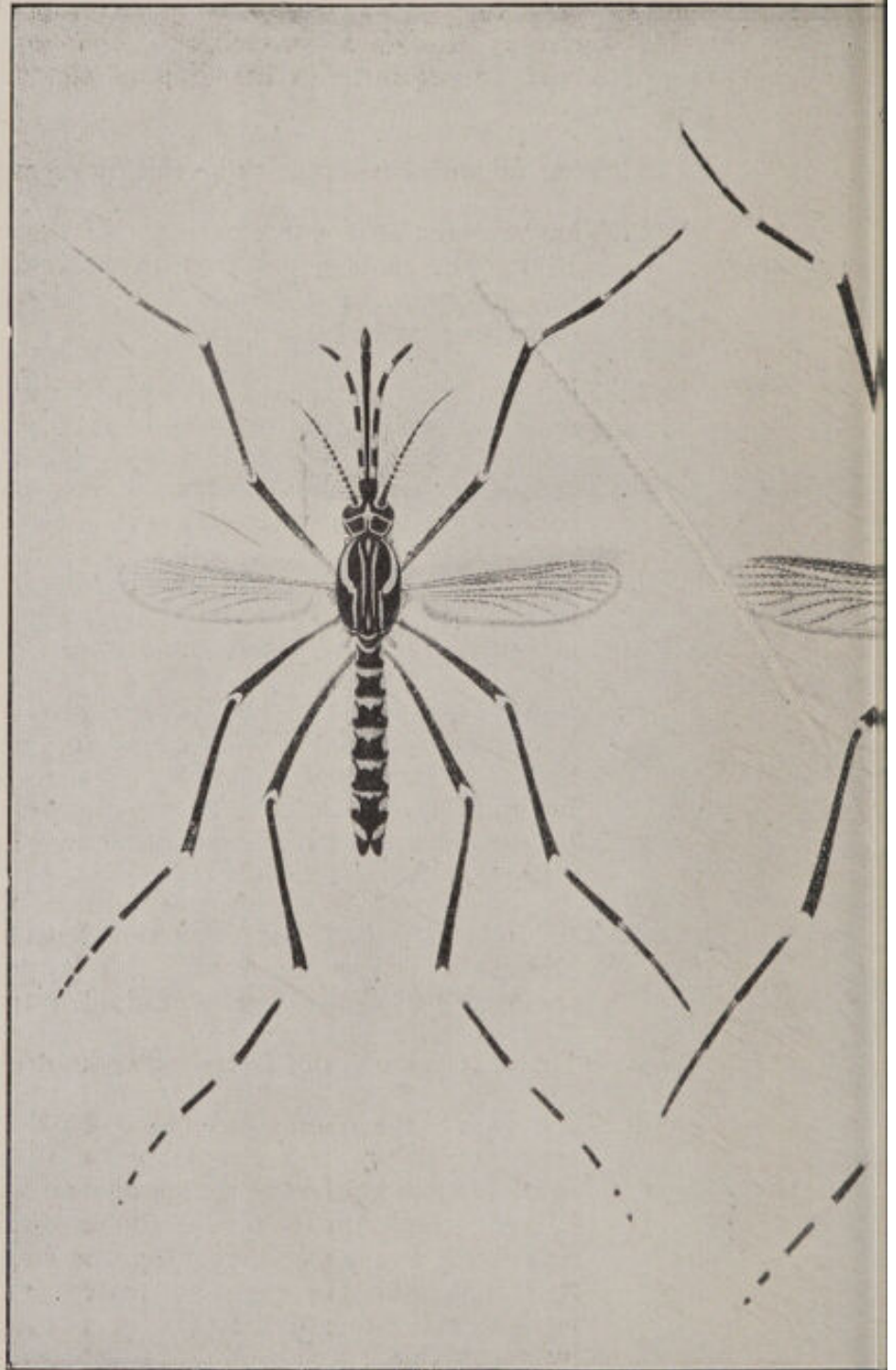
The larvæ however quickly die if removed from water.

The mosquitoes may live for many weeks in the rooms, verandahs and outhouses.

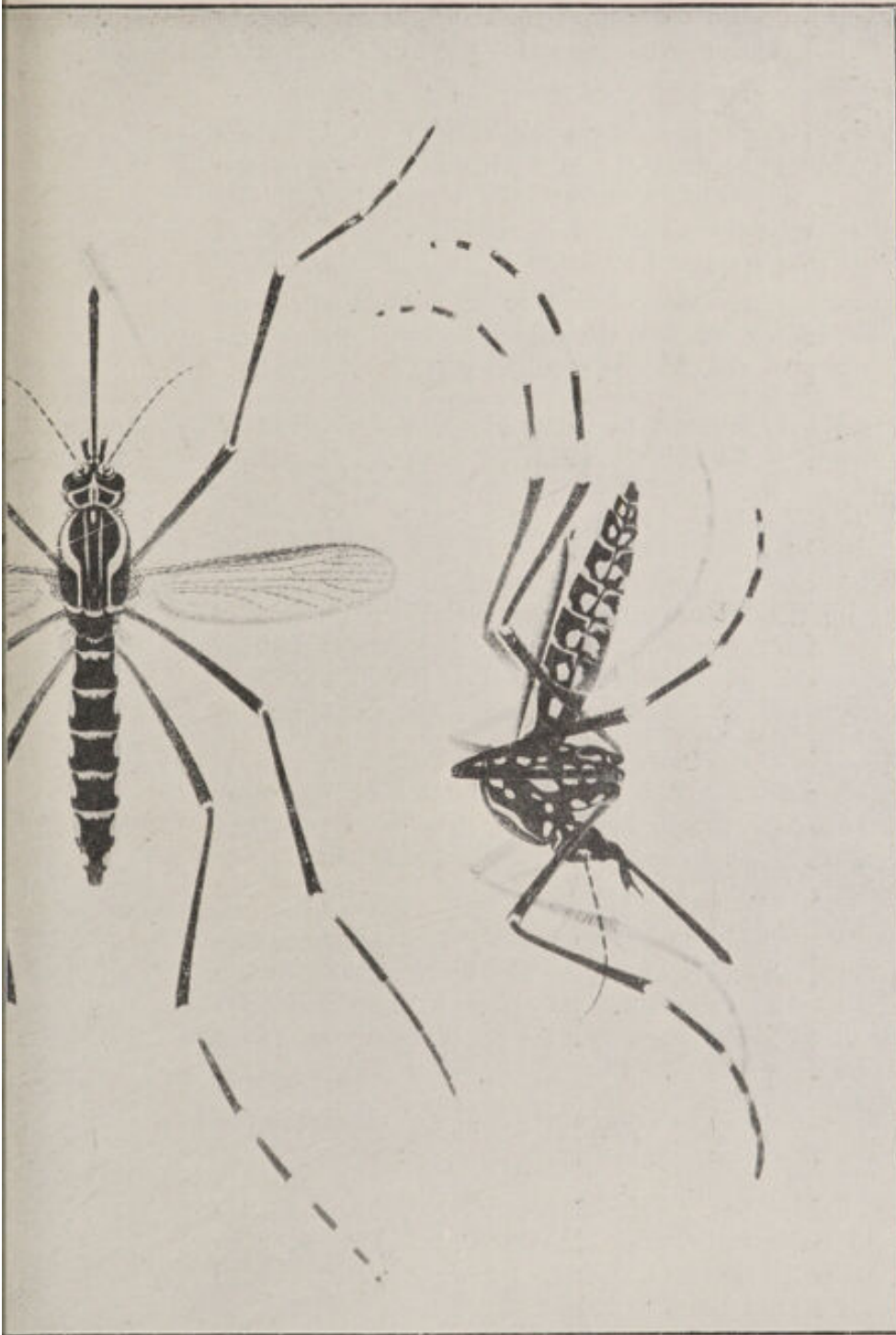
11. Water is therefore essential to the existence of the mosquito and to prevent the breeding of the *Stegomyia*, it is necessary—

1. That all water receptacles be rigidly screened.
2. That the material for screening be brass wire gauze, 18 meshes to the inch to prevent ingress or egress of the mosquito, no chinks being overlooked, or an overflow pipe left unprotected.
3. That the brass gauze be fixed by wooden fillets or copper nails to wood, no iron nails to be used.
4. That each householder should set an example by screening his own water cistern.
5. That all public water cisterns should be screened, the local authorities, state, municipal, or ecclesiastic and others who control public cisterns, setting the example.
6. That in the yards of the poorer people each storage barrel be supplied with a spigot to draw off the water and that the top be securely screened; loose covers being of no use. That as soon as possible all barrels be done away with and replaced by properly screened cisterns.
7. That odd receptacles such as tins, bottles, etc. be never allowed to litter the yards, but be gathered up and removed by the dust cart or buried in the ground.
8. That water should not be stored in kerosene tins.
9. That in an emergency screening be done with cheese cloth until the permanent brass wire screens are available and at the same time one pint of kerosene oil be poured on the water in the cisterns and barrels at least once every week, pending the screening. Oiling must not take the place of permanent screening. It must be remembered that the oil is soon washed away by heavy rains.

NOTE.—Oil is used because it forms a film on the surface of the water and so prevents the wiggle waggles from coming to the surface to breathe; in consequence they soon die. The oil does not impart a taste to the water.



The Yellow Fever Mosquito—*Stegomyia fasciata*, Fabricius—M
the excellent figures in "Os Mosqu"



Female, and Side View. Magnified about 20 times. (Taken from "no Para," by Dr. Goeldi, Para, 1905.)

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14. A patient suffering from yellow fever is capable of infecting mosquitoes during the first three days of the attack. If bitten by a *Stegomyia* during this period the mosquito becomes itself infected and after the lapse of a period of some 10 days is capable of transmitting the disease to a healthy person.

The power which an infected mosquito possesses of transmitting yellow fever has been demonstrated to persist for many weeks (a period of 154 days is recorded). The bite of a single infected mosquito is sufficient to cause an attack of yellow fever. During the cold season, although the mosquitoes may not be active and bite, they may remain quiescent in some parts of the house, and upon the advent of warm weather, become active, and if infected in the previous year, be capable of transmitting infection and starting a fresh epidemic.

15. The following precautions must be adopted in case of infection or in any suspicious cases—

1. The patient must at once be properly screened in order to prevent the access of mosquitoes. Where there is any doubt as to the true nature of the fever, screen the patient until the diagnosis is firmly established.
2. The room which the patient occupies should at once be screened to prevent the egress of any infected mosquitoes.
3. The other rooms in the house, outhouses, basements, and closets, should be thoroughly fumigated to destroy all mosquitoes.

It would be better, however, to remove the patient to a proper isolation hospital and to thoroughly fumigate the whole house.

4. All houses, outhouses and offices in the immediate vicinity should be thoroughly fumigated.
5. If the epidemic is spreading general fumigation of the town should at once be undertaken by the sanitary authority with the co-operation of the citizens.
6. To be efficient, fumigation should be done by experts only as it is most essential to thoroughly stop all apertures in the rooms.

Infected mosquitoes can readily escape through very small chinks.

No matter how large the openings in the verandahs or rooms, they can be readily closed with paper by men possessing skill.

7. The fumigating materials used are as follows—

1. *Sulphur*.—Allow two pounds of sulphur to 1,000 cubic feet. Use two pots, place them in a pan containing 1 in. of water to prevent damage and set fire to the sulphur by means of spirit.

Duration.—3 hours.

2. *Pyrethrum*.—Allow three pounds to 1,000 cubic feet and divide amongst 2 or 3 pots, using the same precautions as with sulphur.

Duration.—3 hours.

3. *Camphor and Carbolic Acid*.—Equal parts camphor and crystallised carbolic acid are fused together into a liquid by gentle heat. Vapourise 4 ozs. of mixture to each 1,000 cubic feet; this can be done by placing the liquid in a wide shallow pan over a spirit or petroleum lamp; white fumes are given off. To avoid the mixture burning, the fumes should not come in close contact with the flame of the lamp.

Duration.—2 hours.

Remember that sulphur tarnishes metal work and injures pianos, sewing machines, chronometers, telephones etc.

The camphor carbolic mixture is one of the most agreeable and effective of the various agents.



A Screened House Cistern.

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